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The Saskatchewan Agricultural Research Fund

Annual Report 1981-82

Saskatchewan Agriculture

The Saskatchewan Agricultural Research Fund

The Saskatchewan Agricultural Research Fund

To His Honour,
The Honourable C. Irwin McIntosh
Lieutenant Governor of the Province
of Saskatchewan

Sir:

I have the honour to submit the Third Annual Report of the Saskatchewan Agricultural Research Fund for the period April 1, 1981 to March 31, 1982.

I have the honour to be Sir,

Your obedient servant
Eric Berntson
Minister of Agriculture

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The Saskatchewan Agricultural Research Fund

Honourable Eric Berntson
Minister of Agriculture

Dear Sir:

It is my pleasure to present the Third Annual Report of the Saskatchewan Agricultural Research Fund for the period April 1, 1981 to March 31, 1982.

Respectfully submitted

J. L. Drew
Deputy Minister of Agriculture

The Saskatchewan Agricultural Research Fund

J. L. Drew
Deputy Minister of Agriculture

Dear Sir:

I am pleased to present the Third Annual Report of the Saskatchewan Agricultural Research Fund for the period April 1, 1981 to March 31, 1982.

Respectfully submitted

Lloyd Loyns
Chairman of the Saskatchewan
Agricultural Research Fund

Introduction

The Saskatchewan Agricultural Research Fund was established by the June 15, 1979, proclamation of The Agricultural Research Funding Act. The Fund consists of such money as may be appropriated annually by the Legislature, plus other money which may be transferred into the Fund by the Lieutenant Governor-in-Council. It serves as a capital fund from which the annual earned interest is made available to individuals, corporations, co-operatives, associations or other organizations for the purpose of agricultural research in the Province. Applications are invited annually from interested parties. Initial appropriation for 1979–1980 fiscal year was $3.25 million.

The Fund is administered by a producer-represented Board which has authority to make grants, loans or guarantees or enter into agreements or contracts respecting assistance provided to persons. The Board as appointed by the Lieutenant Governor-in-Council, consists of seven persons, including four practising agricultural producers, two agricultural research professionals and one Saskatchewan Department of Agriculture representative. The Chairman and Vice-Chairman of the Board are designated by the Lieutenant Governor-in-Council. The Board is responsible to the Minister of Agriculture.

Activities 1981-82

In 1981 22 applications for on-going projects were approved for a total of $385,499. These projects had the option of receiving funds on either a calendar or a fiscal year basis. The 15 new grants, were awarded a total of $207,650 on a fiscal year basis beginning April 1, 1982. One 1980 project received an increase of $2,500 for its first year. The Fund received 89 applications requesting a total of almost $2 million.

Twenty-three projects completed their first year in 1981. Abstracts are printed in this report and more detailed reports are available as a separate publication.

Audited financial statements of the Fund, as provided by the Provincial Auditor, are presented herein as the final section of this report.

The Board extends their appreciation to all who submitted applications in 1981 and hopes that this degree of interest will be maintained. They look forward to great benefits to agriculture from the research that will be forthcoming.

Saskatchewan Agricultural Research Fund Board 1981-82

CHAIRMAN: **Mr. Lloyd Loyns,**
LAC VERT, S0K 2G0

VICE-CHAIRMAN: **Dr. J. Milton Bell,**
Department of Animal and Poultry Science,
University of Saskatchewan,
SASKATOON, S7N 0W0

MEMBER: **Mr. Lynn Biggart,**
CUT KNIFE, S0M 0N0

MEMBER: **Mr. Ian Boyes,**
KELVINGTON, S0A 1W0

MEMBER: **Mr. Bev Currie,**
P.O. Box 852,
SWIFT CURRENT,
S9H 3W9

MEMBER: **Dr. Alfred Slinkard,**
Crop Development Centre,
University of Saskatchewan,
SASKATOON, S7N 0W0

MEMBER: **Miss Marjorie L. Benson,**
Associate Deputy Minister,
Saskatchewan Agriculture,
3085 Albert Street,
REGINA, S4S 0B1

SECRETARY: **Mr. Brian S. Freeze,**
Saskatchewan Agriculture,
3085 Albert Street,
REGINA, S4S 0B1

Ms. Brenda R. Machin,
Saskatchewan Agriculture,
3085 Albert Street,
REGINA, S4S 0B1

Distribution of Projects and Funding by Program Area

Program Area	Awarded 1980–81	Awarded 1981–82	% of Total Awarded 1980–81	% of Total Awarded 1981–82	Assigned 1980–81	Assigned 1981–82	% of Total Assigned 1980–81	% of Total Assigned 1981–82
Cereal Crops	4	4	17	11	80,500	79,675	22	13
Special Crops	5	6	22	16	62,300	96,700	17	16
Forage Crops	2	3	9	8	13,500	30,150	4	5
Horticultural Crops	2	3	9	8	33,400	26,617	9	5
Ruminants	3	6	13	16	55,530	109,458	15	18
Non-Ruminants	3	6	13	16	75,625	130,639	20	22
Land, Air, Water	1	3	4	8	13,000	48,000	3	8
Energy & Equipment	1	3	4	8	19,288	26,180	5	4
Socio-Economics	1	1	4	3	16,000	10,000	4	2
Food	1	2	4	5	4,620	38,230	1	6
Totals	23	37			373,763	595,649		

Approved Projects 1981

Title	Research Manager	Institution	1981 Grant
Cereal Crops			
Effects of the Rate and Date of Preseeding Fertilizer Placement and Postseeding Packing Requirements When Using a Pneumatic Seeder	L. A. McLean	Crop Science Dept., University of Sask.	$18,000
Evaluation of the Nitrogen Requirements for Wheat Grown Under the Zero Till Farming System	D. A. Rennie	Dept. of Soil Science, University of Sask.	$20,000
The Inheritance and Nature of Sprouting Resistance in Barley	B. L. Harvey	Crop Science Dept., University of Sask.	$24,800
The Role of Supercooling in Herbaceous Plants in Preventing Frost Damage	L. V. Gusta	Crop Development Centre	$16,875
Special Crops			
Improved Management Practices for Canaryseed Production	A. E. Slinkard	Crop Development Centre	$11,000
Rapeseed Meal and Rapeseed. By-Product Evaluation and Utilization	J. M. Bell	Dept. of Animal and Poultry Science	$34,330
Biology and Control of Ascochyta Blight of Lentil	R. A. A. Morrall	Dept. of Biology, University of Sask.	$14,250
Factors Affecting Soil Persistence of Triazine Herbicides Used in Triazine Resistant Rapeseed	R. B. McKercher	Soil Science Dept., University of Sask.	$15,450
Triazine Research on Triazine Resistant Rapeseed	Ken Goudy	Melfort	$ 5,000
The Development of Recommendations for Economic Seeding Rates of Faba Beans and Broadbeans and an Evaluation of Seeders for Sowing Pulse Crops (Faba Beans, Broadbeans, Chickpeas, Lentils, and Dry Beans)	G. G. Rowland	Crop Development Centre	$16,670
Forage Crops			
Breeding Leafcutter Bees Adapted to the Saskatchewan Environment	G. H. Rank	Dept. of Biology, University of Sask.	$ 5,850
Development of a Trisomic Series in Russian Wild Rye Grass	G. Scoles	Crop Science Dept., University of Sask.	$13,000
An Evaluation of Winter Hardiness in Saskatchewan Forage Crops	A. E. Limin	Crop Science Dept., University of Sask.	$11,300
Horticultural Crops			
Weed Control in Commercially Produced Onions	D. H. Dabbs	Dept. of Horticulture, University of Sask.	$ 7,500
Utilization of Waste-Heat from a Potash Mine for Protected Cultivation	E. A. Maginnes	Dept. of Horticulture, University of Sask.	$14,467
Vegetable Varietal Trial	C. Oliver Green	Prairie Produce Ltd.	$ 4,650

Title	Research Manager	Institution	1981 Grant
Ruminants			
Intensification of Sheep Production Under Prairie Conditions	N. C. Rawlings	Western College of Veterinary Medicine	$28,178
A Study of the Effect of B-Carotene on Reproduction in Cattle	F. Bristol	Western College of Veterinary Medicine	$17,000
The Evaluation of Effects of Sulfates and Other Elements in Drinking Water on Trace Mineral Requirements of Cattle	C. M. Williams	Dept. of Animal and Poultry Science, University of Sask.	$17,000
Improvement of Provincial Sheep Flock (Investigation of Techniques Like A.I. and Embryo Transfer)	G. Tosh, D. Donald, J. Nohachowsky	Rockhaven	$10,350
Embryo Transfer in the Cow: Effects of PMSG and FSH on Superovulatory Response, Ova Recovered, Ova Fertilized and Endocrinology	R. J. Mapletoft	Western College of Veterinary Medicine	$20,000
Studies on Selenium Status in Wintering Beef Cattle	B. Laarveld	Dept. of Animal and Poultry Science, University of Sask.	$16,930
Non-Ruminants			
The Implementation and Demonstration of an Improved Post Weaning Environment for Pigs and the Resultant Influence on Productivity and Respiratory Disease Pathology	H. Fast	Veterinary Infectious Disease Organization	$35,179
The Influence of Nutritional Density on the Productivity of Chicken Broilers	H. L. Classen	Dept. of Animal and Poultry Science, University of Sask.	$29,060
The Feasibility of Utilizing Saskatchewan Reared Honeybee Queens in Commercial Honey Production	T. Taylor, S. Clifford	Nipawin	$15,000
Home Range and Migration in Pest Population of the Plains Garter Snake (*Thamnophis radix*) on Farms in Southern Saskatchewan	D. M. Secoy	Dept. of Biology, University of Sask.	$ 3,900
The Economics of Wheat and Grain/Protein Ratios in Growing/Finishing Hog Rations	R. Blair	Prairie Swine Center	$25,000
Traction of Sows on Farrowing Crate Floors	G. I. Christison	Dept. of Animal and Poultry Science, University of Sask.	$20,000
Land, Air, Water			
Studies on the Efficient Utilization of Liquid Hog Manure	L. A. McLean	Crop Science Dept., University of Sask.	$16,500
Methodology for Rapid Measurement of Field Moisture	D. Cameron	Normac Enterprises Swift Current	$ 8,500
Micronutrient Status and Transformations in Saskatchewan Soils	R. E. Karamanos, J. J. Germida	Dept. of Soil Science, University of Sask.	$23,000

Title	Research Manager	Institution	1981 Grant
Energy and Equipment			
Energy-Deep Till Discer Seeder	W. B. Reed	Agricultural Engineering, University of Sask.	$12,230
Leduc Dryland Weed Patrol — A Flexible Floating Subsurface Wide Sweep Tillage Implement	L. Leduc	Assiniboia	$ 4,500
Evaluation and Comparison of the Spinning Disc (Rotary Atomizer) and Low Pressure (L.P.) Nozzles with Conventional Flat Fan Nozzles	D. G. Pchajek, D. C. Campbell	Sask. Wheat Pool	$ 9,450
Socio-Economics			
Economic Organization of Saskatchewan Agriculture	W. H. Furtan	Dept. of Agricultural Economics, University of Sask.	$10,000
Food			
Production of a New Variety of Whey and Sugar Fermenting Bacteria Through Applied Genetics	G. C. K. Khachatourians	Dept. of Dairy and Food Science, University of Sask.	$19,830
Sanitizer Residues in Milk and Milk Products in Saskatchewan	E. S. Humbert, G. Blankenagal	Dept. of Dairy and Food Science, University of Sask.	$18,400

Abstracts of Approved Projects 1980

Cereal Crops

Effects of the Rate and Date of Preseeding Fertilizer Placement and Postseeding Packing Requirements When Using a Pneumatic Seeder

L. A. McLean — $21,000
Crop Science Department
University of Saskatchewan

Phosphorous fertilizer was applied at four rates and three times and at two locations. Preliminary yield data indicates a response to phosphorus levels with possibly small differences due to method of application. Packing was found to increase seed emergence, reduce grain moisture at maturity and increase wheat yield.

Evaluation of the Nitrogen Requirements for Wheat Grown Under the Zero Till Farming System

D. A. Rennie — $29,150
Soil Science Department
University of Saskatchewan

This project, with treatments designed to provide a better understanding of the factors effecting the fertilizer nitrogen requirements for cereal grain grown under a Zero Till Farming System includes field scale experiments carried out on a loam and heavy clay soil in the Leipzig and Drinkwater areas respectively of the province. Maximum use is being made of snow melt water using a selected number of stubble management practices. The fate of fertilizer N whether fall broadcast, broadcast on the snow in early winter, fall deep band or similar placements in the spring are determined using nitrogen 15 labelled urea. This project also includes a number of specialized experiments conducted with the cooperation of Agriculture Canada and the Saskatchewan Wheat Pool.

The Inheritance and Nature of Sprouting Resistance in Barley

B. L. Harvey — $15,500
Crop Science Department
University of Saskatchewan

A source of dormancy was located in the British variety Maris Concorde. This was crossed with local material by Dr. D. R. Metcalfe (Agriculture Canada, Winnipeg), and a dormant line from this cross, WM143-2-3b, was generously made available to us by Dr. Metcalfe. We crossed WM143-2-3b with Norbert, Fairfield and S77433. Norbert is highly susceptible to sprouting, Fairfield has a small amount of dormancy and S77433 is hulless and non dormant.

The following tentative conclusions have been drawn from the preliminary observations we have made to date. This source of dormancy may not be suitable for producing sprouting resistant, hulless genotypes since the dormancy factor appears to be located in the hulls. The inheritance of dormancy is quantitative. It should be possible to select segregants with adequate levels of sprouting resistance. It will be difficult, and perhaps impossible, to select sprouting resistant types with good malting quality since there is a positive relationship between sprouting susceptibility and amylclytic enzyme activity.

The Role of Supercooling in Herbaceous Plants in Preventing Frost Damage

L. V. Gusta — $14,850
Crop Development Centre
Saskatoon

Each year during the growing season unseasonal frosts result in either complete or partial crop loss. Most actively growing plants in the field are frozen in the range of −2 to −5°C. The main cause of freezing injury is when water in the plant is converted to ice. Before ice can form in the plant, ice nucleators must be present or otherwise water will remain in the liquid form. There are no active ice nucleators in plants other than certain bacteria which grow on the leaf surfaces of healthy plants. These bacteria are thought to be responsible for the formation of ice in leaves just below O°C. We are investigating how these bacteria are causing ice formation in plants and also are looking for ways of controlling these bacteria.

Special Crops

Improved Management Practices for Canaryseed Production

A. E. Slinkard — $10,000
Crop Development Centre
Saskatoon

On-farm trials indicated that canaryseed yield did not increase at seeding rates in excess of 20 lb/a (22 kg/ha), provided there was good seedbed moisture and weeds were controlled. The variety Alden was higher yielding than Keet. Stubble-seeded canaryseed yielded only 52% of comparable fallow-seeded canaryseed, indicating that canaryseed is a poor stubble crop. Fertilizer responses were negligible due to the drought. Late dates of seeding resulted in higher yields due to late summer rains after the spring and summer drought. Depth of seeding had no effect on seed yield. Avenge was registered for wild oat control in canaryseed in 1981. A large number of herbicides were found acceptable for weed control in canaryseed and attempts will be made to get some of them registered for use in canaryseed production.

Rapeseed Meal and Rapeseed By-Product Evaluation and Utilization

J. M. Bell — $25,500
Department of Animal and
Poultry Science
University of Saskatchewan

The effects of oil and meal, derived from rapeseed screening, on the nutritional value of canola oil and meal were examined. Special emphasis was placed on stinkweed seed because it contains both glucosinolates and erucic acid. No evidence of impaired nutritional quality was found for levels of weed seeds likely to be found in commercial practice in canola crushing plants. Higher levels of weed seed meal depressed digestible energy, protein and lysine levels in the meal. Ammoniation of screenings eliminated most of the glucosinolates but further work on its effects on protein quality is needed.

Energy values were determined for several rapeseed and canola oils, fatty acids, gums and lecithin to provide basis data for digestible and metabolizable energy evaluation of canola oil products.

Biology and Control of Ascochyta Blight of Lentils

R. A. A. Morrall — $7,700
Biology Department
University of Saskatchewan

Field experiments in 1980 and 1981 showed that ascochyta blight caused yield losses up to 40% but the cultivar Laird was significantly more resistant and suffered less loss than Eston or Commercial lentils. In infested crops seed discolouration was shown to be correlated with extent of mycelial invasion by the pathogen and length of time the crop remained in the swath. Moist harvest conditions are known to increase the severity of seed discolouration but experiments showed that early swathing to avoid unfavourable weather resulted in too much yield loss to be a practical disease control measure. Although previous trials had shown that Vitavex seed treatment had some promise in improving emergence of infected seed and subsequent yield, in 1981 a variety of Vitavex formulations and reference compounds gave no significant improvement over the check. However, it was demonstrated that infected seed is less of an epidemiological hazard than expected because frequency of transmission of the pathogen from seed to seedling is relatively low. At a relatively high soil temperature (eg. 20°C) only about 20% transmission occurred in one experiment. Hence seed with 5% ascochyta infestation would give rise to seedings with only 1% infection.

Factors Affecting Soil Persistence of Triazine Herbicides Used in Triazine Resistant Rapeseed

R. B. McKercher — $15,950
Soil Science Department
University of Saskatchewan

The development of triazine-resistant rapeseed raises the prospect for control of stinkweed and mustard in rapeseed. The chemicals touted for this purpose are the substituted triazines commonly referred to as the *s*-triazines. Little research has been carried out in Saskatchewan on the effectiveness of the chemicals in different soils. We have tests on two soils near Saskatoon, the one on the Kernen Crop Research Farm being on a fine textured soil, and another on the Preston plots being on a medium textured soil. Furthermore, through cooperation with Mr. Ken Goudy of Melfort and Mr. Ken Kirkland of the Scott Experimental Station we have access to tests on soils of very fine texture and high organic matter and a soil of medium texture with acidic reaction.

In addition to the field tests a growth chamber bioassay program is underway wherein studies of residues under closely controlled conditions are possible.

To date the bioassays show little carryover on most of the soils from which results are available.

The Scott soil is still being tested. Residues are generally lower in the finer textured soils. The implication of any residues awaits the 1982 crop season for assessment.

Triazine Research on Triazine Resistant Rapeseed

Ken Goudy — $3,150
Melfort

The use of the s-triazines in triazine resistant rape promises additional weed control in rape. Nevertheless, these chemicals when used in other areas have resided in the soil for prolonged periods and problems have arisen with crops in subsequent years. Little research or demonstration plot work has been carried out on higher organic matter, finer textured soils. The preliminary results on these soils show promise for the use of the s-triazines.

Forage Crops

Breeding Leafcutter Bees Adapted to the Saskatchewan Environment

G. H. Rank — $6,000
Biology Department
University of Saskatchewan

Our objective is to breed alfalfa leafcutter bees better adapted to local conditions. Selections from large populations were made in commercial fields at Shellbrook, Saskatchewan in 1980. Individual tunnels that filled first were marked and hand harvested. Selections were also made on the basis of light in cool weather and performance late in the season.

These slections were placed in replicated field trials at three locations near Saskatoon in 1981. Selected populations were harvested in late September. During October, samples were x-rayed to determine per cent viable cells and numbers of incomplete and parasitized cells in each selection. At the end of October the first of three incubation experiments was begun. Four replicates of each of six selections were incubated at 25°C and 30°C to determine per cent successful emergence, average emergence time, and the male:female ratio. Four replicates of twenty-five cells for each selection were also evaluated for intact and dissected prepupal weights.

A valid comparison of any selection difference will require selection and evaluation over a period of several years.

Development of a Trisomic Series in Russian Wildrye *(Elymus Junceus)*

G. Scoles — $7,500
Crop Science Department
University of Saskatchewan

The aim of this project is to create and then evaluate lines of Russian Wild Ryegrass (*Elymus junceus*) carrying an extra chromosome. These lines will be of value in assocating traits such as height, maturity, leafiness, forage yield and quality with specific chromosomes. Such knowledge will be of use in breeding new cultivars of this species. To date almost 100 plants carrying an extra chromosome have been identified and we are now in the process of trying to determine which particular chromosome is present in these plants.

Horticulture Crops

Weed Control in Commercially Produced Onions

D. H. Dabbs — $6,350
Horticulture Department
University of Saskatchewan

A rather wide range of herbicides and herbicide combinations were assessed on this crop in 1981 and several performed very well. Within the extremely limited number of presently registered materials the best combination was CIPC at 3.0 kg ai/ha applied early postplant followed by Hoegrass at 0.65 kg ai/ha applied when the onions had two leaves, in turn, followed by Totril at 0.5 kg ai/ha when the onions had three leaves. Even this rate of CIPC, which is only two thirds of the normally recommended rate, showed some phytotoxicity to onions on a sandy loam soil. Propachlor (Ramrod) shows promise of perhaps becoming a replacement for CIPC.

Utilization of Waste-Heat From a Potash Mine for Protected Cultivation

E. A. Maginnes — $27,050
Horticulture Department
University of Saskatchewan

In early September 1981, work commenced on the construction of an experimental greenhouse to test the feasibility of greenhouse heating with potash mine exhaust. The structure is 26 feet wide by 48 feet long and quonset-shaped. It is covered with two layers of polyethylene. The first layer is attached to the arches and the second only around the periphery. This will allow the layers to be separated by inflation. At present 5,000 cubic feet per minute (cfm) of the 250,000 cfm from the mine are passed between the covering layers. Mine exhaust should exit at 27°C (80°F) but due to problems in the mine only 15.5°C (60°F) has been received until recently.

Started lettuce plants showed no ill effect from the greenhouse environment after four weeks of growth. A new set of lettuce seedlings will be planted in the near future.

It appears that both the structure and growing system are now ready for full scale testing.

Ruminants

Intensification of Sheep Production Under Prairie Conditions

N. C. Rawlings — $22,230
Western College of
Veterinary Medicine
University of Saskatchewan

This project was initiated to investigate the feasibility of intensified sheep production in the prairie farm situation. The primary goal was to combine and test new, existing and experimental techniques

in breeding and controlled reproduction in an overall scheme, aimed at year round lamb production and three lamb crops in two years.

Synchronisation or induction of oestrus in cyclic and acyclic ewes with a combination of a progestin containing intravaginal sponge with P.M.S.G. (pregnant mares serum gonadotrophin) was more successful than synchronisation of oestrus with progestin containing intravaginal sponges alone.

Analysing serum from ewes 16 to 19 days after breeding for progesterone was very accurate in diagnosing non pregnant ewes but less accurate in determining pregnant ewes. Abdominal palpation or ultrasonic pregnancy diagnosis was as accurate but no better than the late pregnancy diagnosis using circulating progesterone levels.

The induction of parturition with estradiol benzoate of a small number of ewes showed promising results for accurately predicting or managing the time of lambing.

A Study of the Effect of B-Carotene on Reproduction in Cattle

F. Bristol — $16,300
Western College of
Veterinary Medicine
University of Saskatchewan

One of the most common conditions affecting reproduction in dairy cattle is unobserved or silent heats. Studies have indicated that a deficiency in B-carotene may contribute to silent heat, less intense heat, delayed ovulation, delayed involution of the uterus, and low conception rates particularly in cows fed corn silage. Little is known about B-carotene content in roughages fed in Saskatchewan.

Eight dairy herds which keep accurate individual cow records and routinely have feed analyzed and feed according to recommendations were used in this study. The herds were fed a variety of roughages, including brome hay, alfalfa hay, oat silage, barley silage and pasture. A sample of cows in each herd was bled every 8 weeks for plasma B-carotene analysis and a sample of forage was also assayed.

Most forages (alfalfa hay, barley and oat silage) resulted in adequate blood B-carotene levels (>300 ug/100 ml). Two herds had a low blood B-carotene level — one was fed a mixture of brome and alfalfa hay while the other was fed oat silage. It appears that there should be at least 10 mg/lb of B-carotene (dry basis) in the forage in order to maintain adequate plasma levels. B-carotene does not seem to deteriorate as quickly as hay as has been previously reported. In this study the level of plasma B-carotene was not correlated to calving to conception intervals, services per conception or first service conception rate but may play a role in the intensity or length of heat. Further studies are necessary to determine its role in the expression of heat.

As B-carotene does not appear to deteriorate very quickly in forages in this area, cattlemen should determine the levels in forage and if possible plasma before considering supplementation.

A Farm System for Removing Dissolved Salts from Well Water

C. M. Williams — $17,000
Department of Animal and
Poultry Science
University of Saskatchewan

The first step of developing the water purification system, for a project to study the effect of dissolved salts in drinking water on the trace element nutrition of beef cows, has been successfully completed. The unit is capable of producing 800 gallons per day of water with a purity of 150 ppm. The system is now providing the water for studies on beef cows which are being supplemented or not supplemented with copper and receiving either the purified or unpurified water.

Non-Ruminants

The Implementation and Demonstration of an Improved Post Weaning Environment For Pigs and the Resultant Influence on Productivity and Respiratory Disease Pathology

H. Fast — $32,495
Veterinary Infectious
Disease Organization
Saskatoon

Two nursery systems were used to help improve post weaning performance by weaning pigs into an area cleaned and isolated from the remainder of the barn. Box nurseries, comprised of 4×6×2 foot deep boxes, were tested in two 70 sow herds, while an all in–all out room nursery system was tested in one 110 sow herd and compared to a continuous raised flat deck system.

The box nurseries were constructed in 1980 from plywood, fibreglass T-bar slats and 4" PVC pipe at a labour and material cost of $428.00. Pigs were weaned into one of these boxes or onto a traditional raised flat deck system. After a two or three week period, the pigs were removed from the boxes and placed on the decks until sale to an off premise feeder barn.

Production parameters including growth rate, feed used and mortality were monitored during the period in the boxes and until sale. There was no improvement in production due to the use of these box nurseries in either of the two cooperating herds.

A three-room all in–all out nursery system was constructed within an existing barn on a 110 sow farrow to finish unit and pigs were weaned alternatively into either the all in–all out nursery or onto a raised flat deck system with continuous occupancy. Growth rate, feed used and mortality were monitored during the nursery period and growth rate and the amount of Atrophic Rhinitis and lung pathology present at slaughter was recorded.

Based on the first 1904 pigs through the two nursery systems, there was a 15% improvement in growth rate and 40% reduction in mortality. At slaughter the severity of Atrophic Rhinitis was 13% less and the amount of lung pathology was 34% less in pigs raised in the room nursery. At time of writing, many of the pigs have yet to go to slaughter and while preliminary data indicates that the more rapid nursery growth may not carry through the feeder barn the economics during the post weaning period are encouraging.

The Influence of Nutritional Density on the Productivity of Chicken Broilers

H. L. Classen — $25,930
Department of Animal
and Poultry Science
University of Saskatchewan

The influence of dietary nutritional density on broiler productivity was studied in three trials utilizing a total of 5760 chicks. Growth rate, for the most part, was adversely affected by decreasing nutrient density, but considerable variation in the amount of weight reduction was noted. The variation in growth depression was found to be largely due to the nature of feed ingredients used. As expected, the amount of feed required to produce a kilogram (kg) of live broiler increased with lowering densities. Some indications that the incidence of acute death syndrome and leg problems might be influenced by nutritional density were noted, but the significance of these findings remain to be clarified.

Despite the poorer biological performance as measured by growth rate and feed conversion the feed cost of producing a kg of live broiler was lowest when low density feeds were used (Ingredient costs, May, 1981). These results indicate that we must increase our knowledge of the biological effects of nutrient density on broiler production so that the most economical feeding program can be selected when the costs of major ingredients or their relationship to one another change. In addition, all possible feed ingredients that might be used at lower nutrient densities should be examined.

Physical Characteristics of Perforated Floors for Young Pigs

G. I. Christison — $19,700
Department of Animal
and Poultry Science
University of Saskatchewan

Physical characteristics such as hole size, void: solid ratio, heat loss, surface temperature, friction, traction and abrasion were measured for nine perforated floors used by young swine. These results are presented and are used in conjunction with other experimental results concerning the performance and preference of swine to make recommendations concerning desirable characteristics of floors for young pigs.

Land, Air, Water

Studies on the Efficient Utilization of Liquid Hog Manure

L. A. McLean — $13,000
Crop Science Department
University of Saskatchewan

Liquid hog manure was applied to established alfalfa at rates up to 16,000 gallons per acre and to barley at rates up to 8,000 gallons per acre with three separate placement techniques. Yield increases of approximately 300 lbs. grain per acre were measured on the barley experiment and 700 lbs. forage per acre on the alfalfa experiment. The liquid hog manure was found to contain 10 lbs. N, 2 lbs. P_2O_5 and 5 lbs. k_2O per 1000 gallons.

Energy and Equipment

Energy-Deep Till Discer Seeder

W. B. Reed — $19,288
Department of Agricultural
Engineering
University of Saskatchewan

A pneumatic seeding attachment to be added to discers has been designed, built and installed on an M-F No. 36, 15 foot wide machine. This attachment will permit deep tillage, deep banding of fertilizer and seeding at normal depths along with the application of soil applied herbicides. Preliminary field trials have indicated that the concept is feasible, thus permitting a single field operation to accomplish these tasks on both stubble or summerfallow cropping. Any benefits or disadvantages with respect to crop yield will be determined during 1982 when field trials will be made.

Socio-Economics

An Economic Analysis of the Farm Structure in Saskatchewan

W. H. Furtan — $16,000
Department of Agricultural
Economics
University of Saskatchewan

This project was designed to conduct an economic analysis of the farm structure in Saskatchewan.[1] Much of the data needed such as i) level of farm income, ii) size of family, iii) education of family, iv) wealth of family, v) size of farm, etc., is not available from current statistic sources. This lack of data necessitated a survey of individual farms. The survey is completed and the data has been placed on computer. Analysis of the data will be undertaken in the next phase of the project.

[1] This includes how the existing farmers started and are helping others get started.

Food

Production of a New Variety of Whey and Sugar Fermenting Bacteria Through Applied Genetics

G. G. Khachatourians
Department of Dairy and
Food Science
University of Saskatchewan

$4,620

Symomonas mobilis is the only bacterium that is capable of producing ethanol. Yet, this bacterium has two fundamental limitations: 1) it can ferment only glucose, fructose and sucrose, and 2) it cannot tolerate high concentrations of sugars or ethanol.

To make use of the fermentative ability of this bacterium for the industrial production of ethanol major changes in its make-up is necessary. Such changes are being studied in this project. Using improved strain production methods and selection of 'marked' variety we have 1) isolated new Zymomanas mobilis, 2) characterized the ability of these bacteria to receive new and additional genetic traits from bacteria that can ferment the sugar in whey, and 3) tested stable translation of the new traits. There are some difficulties in the maintenance of such new traits by these bacteria. These difficulties could be eliminated once their biological basis has been researched and understood.

Financial Statements

For the Year Ended March 31, 1982
Office of the Provincial Auditor
Regina, Saskatchewan

Auditor's Report

To the Members of the Legislative Assembly
Province of Saskatchewan

I have examined the balance sheet of the Saskatchewan Agricultural Research Fund as at March 31, 1982 and the statement of revenue, expenditure and fund balance for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as I considered necessary in the circumstances.

In my opinion, these financial statements present fairly the financial position of the Fund as at March 31, 1982 and the results of its operations for the year then ended in accordance with the stated basis of accounting, described in Note 1, applied on a basis consistent with that of the preceding year.

W. G. Lutz, F.C.A.,
Provincial Auditor.

Regina, Saskatchewan,
May 14, 1982.

Statement 1

Saskatchewan Agricultural Research Fund
Balance Sheet
March 31, 1982

(with comparative figures at March 31, 1981)

	1982	1981
Assets		
Cash in bank	$ 2,107	$ 2,465
Investments — at cost (Schedule 1)	3,960,316	3,510,877
Accrued interest receivable	51,322	119,005
	$4,013,745	$3,632,347
Liabilities and Fund Balance		
Liabilities:		
Grants committed, but not paid	$ 590,370	$ 200,507
Accounts payable	942	—
	591,312	200,507
Surplus:		
Capital funds (Note 3)	3,250,000	3,250,000
Funds available for grants	172,433	181,840
Fund balance	3,422,433	3,431,840
	$4,013,745	$3,632,347

(See accompanying notes to the financial statements)

Statement 2

Saskatchewan Agricultural Research Fund
Statement of Revenue, Expenditure and Fund Balance
For the Year Ended March 31, 1982

	1982	1981
Revenue:		
Investment interest	$ 591,587	$ 464,524
Total revenue	591,587	464,524
Expenditure:		
Grants committed during the year	595,649	373,763
Board expenses	3,963	2,567
Printing costs	1,382	—
Total expenditure	600,994	376,330
Excess of revenue over expenditure (expenditure over revenue)	(9,407)	88,194
Fund balance, beginning of year	3,431,840	3,343,646
Fund balance, end of year	$3,422,433	$3,431,840
Represented by:		
Capital funds (Note 3)	$3,250,000	$3,250,000
Funds available for grants	172,433	181,840
	$3,422,433	$3,431,840

(See accompanying notes to the financial statements)

Saskatchewan Agricultural Research Fund
Notes to Financial Statements
March 31, 1982

1. **Accounting Policies**

   Grant commitments are recorded as an expenditure of the Fund at the point in time the Saskatchewan Agricultural Research Fund Board approves the grant. Grants committed but not paid at the year end are reflected as a liability on the balance sheet.

2. **Incorporation**

   The Saskatchewan Agricultural Research Fund was incorporated under The Agricultural Research Funding Act, Chapter A-14.1, 1978 Revised Statutes of Saskatchewan. This Act came into force by proclamation of the Lieutenant Governor on June 15, 1979. The Saskatchewan Agricultural Research Fund is a capital fund from which grants are made to individuals, corporations, co-operatives, partnerships, associations or other organizations for the purpose of agricultural research in the province.

3. **Restriction of Funds**

   This Fund was initially financed with an appropriation of $3.25 million. The intention of the Saskatchewan Agricultural Research Fund Board is that only the investment income on this $3.25 million will be made available for expenditures.

4. **Costs Borne by Other Agencies**

   In accordance with established government practice, the Saskatchewan Agricultural Research Fund has not been charged with any occupancy costs and no provision for such costs is reflected in these financial statements. These costs together with certain general administrative and employee benefit costs are absorbed by various departmental appropriations.

Schedule 1

Saskatchewan Agricultural Research Fund
Summary of Investments
As at March 31, 1982

Description	Rate	Maturity Date	Amount
Canada Development Corporation Promissory Note	15.47	April 1, 1982	$ 73,261
Barclays Bank of Canada Bearer Discount Note	15.60	April 6, 1982	323,095
Associates Capital Corporation Promissory Note	15.80	April 14, 1982	68,750
Hong Kong Bank Bearer Discount Note	15.85	April 15, 1982	1,036,053
Gen-Star Promissory Note	15.80	April 20, 1982	59,105
Alcan Promissory Note	15.25	May 3, 1982	257,784
Grindley's Bank Bearer Discount Note	15.75	May 4, 1982	43,809
Pioneer Trust Company Guaranteed Investment Certificate	16.05	May 14, 1982	60,000
Societe Generale Promissory Note	16.25	June 28, 1982	38,459
Guaranty Trust Company of Canada Guaranteed Trust Certificates	14.25	April 25, 1983	1,000,000
Canada Permanent Trust Guaranteed Investment Certificate	15.00	April 14, 1985	500,000
Canadian Imperial Bank of Canada Certificate of Deposit	12.00	June 17, 1985	500,000
Total investments			$3,960,316